

Office of Hydrologic Development Hydrologic Software Engineering Branch Quarterly Activity Newsletter October 2010

Software for NWS Hydrology!

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1. HIGHLIGHTS OF July, August, September 2010

AWIPS baseline software development efforts were minimal again for this quarter.

Almost all of our AWIPS activities continue to be providing considerable support to the AWIPS II evaluation. We have continued to install the latest contractor software releases and evaluate each release as it is available.

For Next Generation Radar (NEXRAD), our main task has been validating and implementing fixes to the dual polarization (or dual pol) Quantitative Precipitation Estimation (DP QPE) algorithm and products operational software. During our testing over the past few months, we discovered and are addressing a few serious issues with the DP QPE algorithm. In addition, our testing exposed a critical issue, a calibration problem with the differential reflectivity (Zdr). There has been a slip of about 4-6 weeks in the dual pol deployment schedule to provide more time for hardware documentation. The start of deployment of the dual pol hardware and associated Build 12 RDA software to beta sites will begin in early January 2011 (vs. mid-November 2010). Full deployment of dual pol is scheduled to begin in mid-April 2011 (vs. mid-March 2011) and to end in late 2012.

It has been a busy quarter on the CHPS front! The main news was that in August two of the four CHPS Acceleration Team (CAT) RFCs began using CHPS routinely as part of their daily operations; they are ABRFC and NWRFC. Other highlights include: delivery of the CHPS hardware to the CAT-II RFCs; Advanced System Manager training for the CAT RFCs; and the start of Beta testing for the first complete release of CHPS BOC at the CAT RFCs.

In the CHPS Forcings area, we completed the last of the “show-stopper” enhancements requested by the CAT-II RFCs for transition to CHPS. The enhancements are the re-appearance of the Post Analysis capability and a short cut to re-start MPE/DailyQC for offices who leave the MPE GUI up for long periods of time. These last changes are being tested at a couple of RFCs before being made available to all RFCs.

2. NEXRAD SOFTWARE DEVELOPMENT

2.1 Dual Polarization

During testing of the DP QPE algorithm the past few months, OHD identified a number of issues and is working mainly with the algorithm source scientists at NSSL to correct the issues. For DP QPE issues, NSSL provides corrections, and OHD validates and implements the fixes in the operational baseline. In addition, OHD is part of a team of dual pol experts, including ROC, NSSL, WDTB, and SEC, which oversees the evaluation of dual pol data quality and algorithms.

Although all of the DP QPE algorithm issues will not be fixed in the initial dual pol build (RPG Build 12.1), we plan to have the most serious issues fixed soon after dual pol hardware deployment begins. Some of these algorithm issues have arisen seemingly late in the dual pol program because of 1) a lack of consistent quality data from the test-bed radar (KOUN) and 2) a lack of diversity of climate and terrain at KOUN. The calibration problem (mentioned above) causes a high bias in Zdr and results in underestimation by the DP QPE. The dual pol contractor (Level 3 Communications) is working to solve this issue.

3. AWIPS RELEASE OB9

HSEB continued to act as a consultant to OCWWS/HSD and the AWIPS contractor for DR issues arising with OB9.2.x. There was nothing particularly notable this period.

3.1 WHFS Improvements

Information on the WHFS, data ingest, and precipitation processing (e.g., MPE/DailyQC) applications are accessible on the NWS Office of Climate, Water and Weather Services Hydrologic Services Division (OCWWS/HSD) support web page at: <https://ocwws.weather.gov/intranet/whfs/>.

No significant work has been done on WHFS in the last quarter.

3.2 Precipitation Processing Improvements

The changes made to the MPE/DailyQC application related to CHPS are described in the CHPS Forcings section.

3.3 Field Tests

The following evaluations at certain offices are ongoing:

- CAT and CAT-II RFCs are using a post-OB9.2 version of MPE/DailyQC to provide gridded forcings for CHPS.

4. DEVELOPMENT SUPPORT ACTIVITIES

4.1 New RFC Software Architecture: CHPS

Visit the CHPS web site at <http://www.nws.noaa.gov/ohd/hrl/chps/index.html> to review the history of the project. The CHPS page can also be accessed from the main OHD page (<http://www.nws.noaa.gov/ohd/>).

4.1.1 CHPS Implementation

CHPS Acceleration Team (CAT)

In August ABRFC and NWRFC issued their very first operational products using CHPS! This momentous occasion was captured in a NWS News (NWSN) article dated September 3, 2010 (“Retirement News: NWSRFS Submits its Papers! CHPS Taking Over.”).

A technical problem subsequently prevented ABRFC from continuing to use CHPS in operations; ABRFC did however return to operational use of CHPS in September once the problem was addressed. Meanwhile the NWRFC began using CHPS in their routine operations as part of a “shake down” period; their goal is to evaluate the readiness of the system in all aspects (functional completeness, system performance and reliability, and quality of operational support). In both cases the RFCs are running NWSRFS in “quiescent” mode as a backup should CHPS fail for some reason. The remaining two CAT RFCs (CNRFC and NERFC) plan to go operational with CHPS over the next few months with CNRFC starting in mid-October.

Also in August, OCWWS HSD arranged for special advanced system manager training for the CAT RFCs using leftover FY10 NSTEP funds. A FEWS system expert from Deltares, Frederick van den Broek, met in Silver Spring, MD with CHPS system managers from all four CAT RFCs to provide some supplemental training and troubleshooting techniques.

Deltares and OHD announced that the September release of CHPS would be the first to meet all of the BOC functional requirements, and would include some significant performance improvements. Based on the CAT’s decision in March to forego further attendance at Software Acceptance Testing (SAT) in Silver Spring, the project manager instead arranged for Deltares to lead daily conference calls during the Beta testing period of this release, to facilitate accurate and complete information sharing when problems are encountered, and to enable fast turnaround of software fixes. So far this approach seems to be going well. A more formal SAT (required for hand-off from the contractor to the government) will occur in October at the very end of Beta testing. The release is scheduled to be deployed to the CAT-II RFCs in mid-October.

CHPS Acceleration Team-II (CAT-II)

Things remained quiet over the summer with the CAT-II RFCs, who continue to migrate their NWSRFS configurations to CHPS, and practice with the new system.

In late September the final set of hardware for the “Online” system began to arrive at CAT-II

offices, to supplement the first half of the system deployed one year ago. OCWWS HSD is working on the installation procedures (“Mod Note”) for distribution next quarter; HSD will lead the installations.

CHPS Software Development

HSEB developers completed a few non-model related BOC features. Both of these features are part of the BOC CHPS release and are being tested.

1. Generate headwater-based flash flood guidance (FFH) and area/zone-based flash flood guidance (FFG) in CHPS.

This consists of porting the existing NWSRFS algorithms to CHPS and includes generating the SHEF formatted text products for FFH and FFG and the GRIB formatted grid product for FFG (i.e., NWSRFS PRODGEN functionality).

2. Tune the OHDFewsadapter and some OHD models to improve the performance of ESP runs (by using multi-threaded FEWS option).

Initial testing showed good results. Eric Jones at ABRFC noted, “This helped our ALLQPF run on the CHPS Stand-Alone system go from 15:58 to 10:41. It’s a pretty large increase in performance.” When testing his ESP runs he noted, “....down from 15m 52s without multi-threading to 7m 3s with 8 processors....this should be sent to all RFC's that run ensembles as this is quite a marked improvement.”

One existing NWSRFS feature yet to be completed is the SSHP data extraction utility. This is an existing sub-component of SSHP that retrieves model parameters and states from the NWSRFS operational database (FS5FILES). In CHPS this utility will need to retrieve these data from the FEWS database. We plan to make this available for the December 2010 release.

Finally, HSEB folks continued to help with CHPS support issues. Our developers are delving into all areas of CHPS for the purpose of training and improving CHPS support. We’ve set up an internal buddy system where a pair of developers works on issues originally posted to the chps_ops infolist and then passed on to HSEB from HSD. All indications are the CHPS support is adequate and our HSEB folks are getting valuable hands-on training.

CHPS Forcings

Progress towards generating gridded forcings for use in CHPS continued. The list-server continues to be used as a medium for discussion between RFCs of the setup and use of MPE/DailyQC.

HSEB completed work on the list of “show-stopper” issues which need to be addressed before the CAT-II RFCs can effectively use MPE/DailyQC to generate gridded input for CHPS operations. During this period, we finished the final two “show-stoppers”, one large and one small. The large one was the return of a Post Analysis capability for MPE as requested by OHRFC and NERFC. The smaller item was the addition of a quick and simple re-start

mechanism requested by MBRFC to use in cases where the GUI sits open for hours at a time. These last two enhancements are being beta tested at a couple of RFCs before being released to all a little later in the fall.

Note that these “show-stopper” changes are beyond what is available in AWIPS OB9.2.x. HSEB is making plans to ensure that these enhancements will be available in the AWIPS II environment as soon as possible after AWIPS II is deployed. The enhancements will need to be re-implemented in the AWIPS II environment (since Raytheon has rewritten MPE/DailyQC for AWIPS II) to minimize the disruptions to the use of CHPS during the transition from AWIPS to AWIPS II. HSEB is in contact with Raytheon discussing how to get this accomplished.

4.1.2 Experimental Ensemble Forecast System (XEFS) and Hydrologic Ensemble Forecast Service (HEFS)

HEFS Project planning has started. Details will be provided, as they become available. However, at some point in the next few weeks, the XEFS Planning Team will discontinue. Some activities may continue under a new team.

During the last quarter, HSEB has been working to make the EnsPost, HMOS, and EPP software easier to use by improving the configuration of the XEFS model adapters. In addition, we’ve been testing and improving the Graphics Generator functionality as a replacement to ESPADP with some additional displays for probabilistic information. Recently, we’ve gotten good feedback during beta testing at CNRFC and NWRFC and from the NWS Regions through the AHPS web-team. The next delivery of the XEFS and Graphics Generator is scheduled for November 4th, 2010.

4.2 AWIPS II

During this period, HSEB personnel continued to support the testing of the interim releases of AWIPS II software provided by Raytheon. As most of you are aware, Raytheon is still making changes to the AWIPS II software to address missing functionality and serious problems which must be fixed prior to the start of the Field Operational Test and Evaluation (OT&E). Under the latest plans, the hydro software is not expected to be completely delivered for testing until late in 2010 at the earliest. Latest AWIPS schedules show Field OT&E to start now in July 2011 rather than February 2011.

In August, OHD sent a developer to Omaha to work out a mechanism for collaborative development with Raytheon. The OHD AWIPS II development environment is being set up to allow for such collaboration. HSEB developers have begun examining the AWIPS II source code in anticipation of beginning to develop enhancements which will be delivered in the AWIPS II environment. The first enhancements of this type are planned to be those needed to support the hydrometeorological forcings for CHPS, i.e., MPE/DailyQC.

5. HYDROMETEOROLOGICAL AUTOMATED DATA SYSTEM (HADS)

Visit our web page at: <http://www.nws.noaa.gov/ohd/hads/>

5.1 HADS Systems and Software

The past several months have been a quiet time for HADS software. No changes were implemented to the real-time data processing application side of HADS. All systems remain stable after upgrading to Linux Red Hat Enterprise v 5.5.

A few more Google Map displays were added to the HADS web environment. These newest pages present DCP locations that transmit on a one hour interval and depict the time interval of river stage and rainfall observations. (http://www.weather.gov/ohd/hads/HADS_G_Views.html)

5.2 HADS Data Network

As of September 30th, there were 14,414 data locations defined for HADS processing, an increase of 139 reporting locations since July 1st.

From these sites, there are 9,200 locations reporting water level / river stage data and nearly 7,000 (6,898) sites providing rainfall observations. A detailed break-down of HADS network sensor information is maintained on a daily basis and can be viewed at: <http://amazon.nws.noaa.gov/hads/parms/parms.html>.